

# Introduction to Botany. Lecture 4

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# Outline

## 1 Questions and answers

## 2 Cell

- Cell overview
- Cell boundaries

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## 2 Cell

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## Previous final question: the answer

What is the difference between chloroplasts and mitochondria?

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What is the difference between chloroplasts and mitochondria?

- While chloroplasts are synthesizing organic compounds, mitochondria produce most of cytoplasmic ATP (energy source) in the plant cell.
- The inner membrane of mitochondria form cristae
- Chloroplasts contain thylakoids bearing chlorophyll in their membrane



# Cell

## Cell overview

# *Cell*

# List of cell structures

- Cell membrane
- Nucleus, nuclear pore, nucleolus, chromatine
- Chloroplast, tylacoids
- Mitochondrion, cristae
- ER (endoplasmatic reticulum/network)
- Goldgi apparatus (AG)
- Vacuoles, lysosomes, peroxisomes
- Ribosomes
- Cell wall

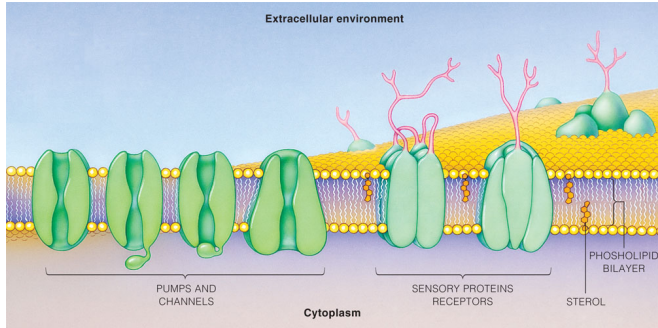




# Cell

## Cell boundaries

# Plasma membrane

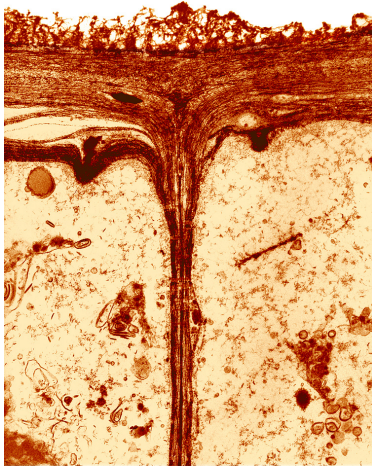


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Phospholipids, sterols, proteins: pumps, receptors, channels

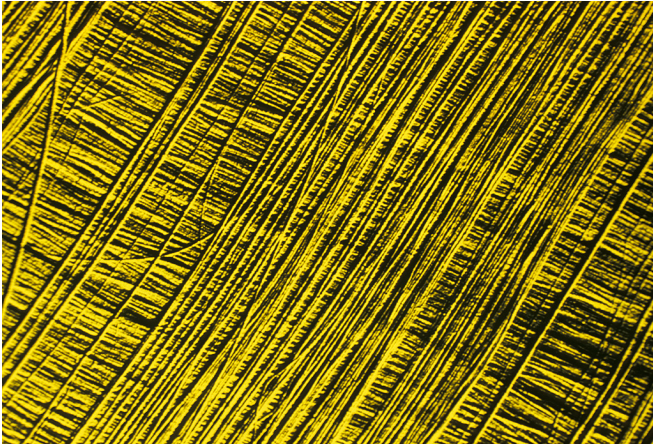


# Cell wall 1



Root cells of an onion showing the cell wall (TEM  $\times 47,000$ )

# Cell wall 2



Cellulose fibers in the plant cell wall (SEM)

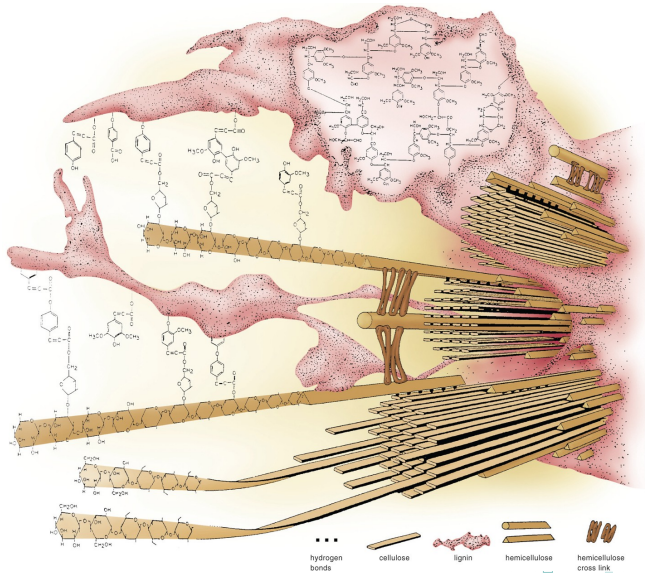


# Primary and secondary cell walls

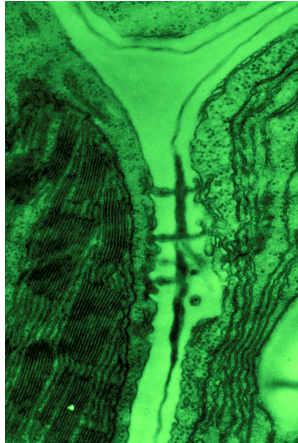
- **Primary cell wall** consists mostly of cellulose and proteins, they are thin and flexible
- **Secondary cell wall** includes hydrophobic lignine and suberine; this inclusion leads to the death of cell. However, dead cells are very useful for plants



# Secondary cell wall: molecules

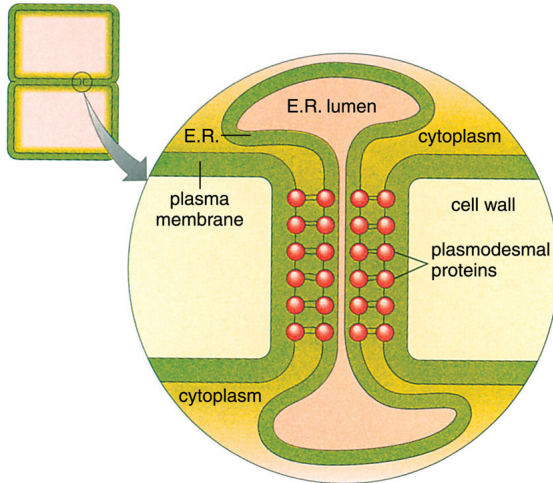


# Plasmodesmata 1



Plasmodesmata in a corn leaf between a mesophyll cell and a bundle sheath cell (TEM)

# Plasmodesmata 2



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E.R. = endoplasmic reticulum (endoplasmic network)



# Final question (3 points)

## Final question (3 points)

Give at least three differences between animal and plant cells.

# Summary

- **Plasma membrane** controls movement of material into and out of the cell
- **Cell wall** limits cell expansion

# For Further Reading



J. E. Bidlack, Sh. H. Jansky.  
*Stern's introductory plant biology*. 12th edition.  
McGraw-Hill, 2011.  
*Chapter 3.*



Th. L. Rost, M. G. Barbour, C. R. Stocking, T. M. Murphy.  
*Plant Biology*. 2nd edition.  
Thomson Brooks/Cole, 2006.  
*Chapters 3.1–3.6.*

